

WHAT IS CLAIMED IS:

1. An air diffusing vacuum transport belt for transporting image carrying substrates without vacuum belt induced image defects, the air diffusing vacuum transport belt comprising:

(a) a first perforated layer for mounting over a vacuum plenum, said first perforated layer including a top surface and a bottom surface, solid areas, and perforated hole areas interspersing said solid areas for directing pressurized airflow from said top surface through to said bottom surface; and

(b) a second non-perforated layer formed over said top surface of said first perforated layer and covering said solid areas and said perforated hole areas, said second non-perforated layer having an inner surface positioned over said top surface of said first perforated layer, and an outer surface for uniformly supporting substrates, and said second non-perforated layer being porous to air for diffusing pressurized airflow from said outer surface thereof into said perforated hole areas of said first perforated layer, thereby enabling transporting of image carrying substrates without vacuum belt induced image defects.

2. The air diffusing vacuum transport belt of claim 1, wherein said first perforated layer is made of an elastomeric material.

3. The air diffusing vacuum transport belt of claim 1, wherein said second non-perforated layer is laminated onto said top surface of said first perforated layer.

4. The air diffusing vacuum transport belt of claim 1, wherein said second non-perforated layer is made of a selected material having a density significantly less than a density of said first layer.

5. The air diffusing vacuum transport belt of claim 1, wherein said outer surface of said second non-perforated layer is smooth for providing a uniform support surface for a back side of an image carrying substrate.

6. The air diffusing vacuum transport belt of claim 4, wherein said second non-perforated layer is made of a woven fabric material.

7. The air diffusing vacuum transport belt of claim 4, wherein said selected material is electrically non-conductive.

8. The air diffusing vacuum transport belt of claim 4, wherein said selected material, relative to said first perforated layer, is less thermally conductive.

9. The air diffusing vacuum transport belt of claim 4, wherein said selected material is felt.

10. An air diffusing vacuum transport assembly comprising:

(a) a frame defining a vacuum plenum assembly including a vacuum chamber;

(b) support means for supporting a moveable continuous belt around said vacuum plenum assembly; and

(c) an air diffusing vacuum transport belt mounted around said frame for supporting and transporting a substrate over said frame, said air diffusing vacuum transport belt including:

(i) a first perforated layer for mounting over a vacuum plenum, said first perforated layer including a top surface and a bottom surface, solid areas, and perforated hole areas interspersing said solid areas for directing pressurized airflow from said top surface through to said bottom surface; and

(ii) a second non-perforated layer formed over said top surface of said first perforated layer and covering said solid areas and said perforated hole areas, said second non-perforated layer having an inner surface positioned over said top surface of said first perforated layer, and an outer surface for uniformly supporting substrates, and said second non-perforated layer being porous to air for diffusing pressurized airflow from said outer surface thereof into said perforated hole areas of said first perforated layer, thereby enabling transporting of image carrying substrates without vacuum belt induced image defects.

11. The air diffusing vacuum transport assembly of claim 10, wherein said vacuum plenum includes a top plate having airflow apertures located below said air diffusing vacuum transport belt.

12. The air diffusing vacuum transport assembly of claim 10, wherein said vacuum plenum assembly includes a fan for moving air from said outer surface of said non-perforated second layer into said vacuum chamber.

13. The air diffusing vacuum transport assembly of claim 10, wherein including tracking rollers for maintaining tracking of said air diffusing vacuum transport belt on said frame.

14. The air diffusing vacuum transport assembly of claim 10, wherein said support means includes a heat pipe roller assembly for removing heat from said air diffusing vacuum transport belt.

15. The air diffusing vacuum transport assembly of claim 14, wherein said heat pipe assembly comprises a roller including a sealed heat conductive fluid.

16. The air diffusing vacuum transport assembly of claim 14, wherein said heat pipe assembly includes cooling fins for dissipating heat from said heat pipe.

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- (a) a machine frame;
- (b) substrate supply and handling means for supplying and moving an image receiving substrate through said machine frame;
- (c) imaging means including marking material for forming an image on said image receiving substrate; and

- (d) an air diffusing vacuum transport assembly for transporting said image receiving substrate within said machine frame, said air diffusing vacuum transport assembly including an air diffusing vacuum transport belt for supporting and transporting a substrate, said air diffusing vacuum transport belt including:

- (i) a first perforated layer for mounting over a vacuum plenum, said first perforated layer including a top surface and a bottom surface, solid areas, and perforated hole areas interspersing said solid areas for directing pressurized airflow from said top surface through to said bottom surface; and

- (ii) a second non-perforated layer formed over said top surface of said first perforated layer and covering said solid areas and said perforated hole areas, said second non-perforated layer having an inner surface positioned over said top surface of said first perforated layer, and an outer surface for uniformly supporting substrates, and said second non-perforated layer being porous to air for diffusing pressurized airflow from said outer surface thereof into said perforated hole areas of said first perforated layer, thereby enabling transporting of image carrying substrates without vacuum belt induced image defects.